



STANDARD SERIES

GLI-22:

Electronic Bingo Systems

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ABOUT THIS STANDARD

This Standard has been produced by **Gaming Laboratories International, LLC.** for the purpose of providing independent certifications to suppliers under this Standard and complies with the requirements set forth herein.

A supplier should submit equipment with a request that it be certified in accordance with this Standard. Upon certification, **Gaming Laboratories International, LLC.** will provide a certificate of compliance along with an appropriate *Gaming Labs Certified™* mark evidencing the certification to this Standard.

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CHAPTER 1

1.0 Overview - Standards for Electronic Bingo Systems

1.1 Introduction

1.1.1 General Statement. **Gaming Laboratories International, LLC (GLI)** has been testing bingo equipment since 1989. Over the years, we have developed numerous standards for jurisdictions all over the world. In recent years, many jurisdictions have opted to ask for testing without creating their own technical standards documents. In addition, with technology changing frequently, new technology is not being incorporated quickly enough into existing standards due to the long process of administrative rulemaking. This document, GLI Standard 22 will set forth the technical Standards for Electronic Bingo Systems governed by State administered regulatory agencies, which do not fall under the purview of the National Indian Gaming Commission (NIGC).

This standard does not apply to Class II Bingo Systems as defined by the NIGC. For more information on technical standards applicable to Class II Bingo Systems please visit the NIGC's website at www.nigc.gov

1.2 Purpose of Technical Standards

1.2.1 Purpose. The Purpose of this Technical Standard is as follows:

- a) To eliminate subjective criteria in analyzing and certifying bingo system operation.
- b) To only test those criteria that impact the credibility and integrity of bingo systems from both a revenue collection and player's point-of-view.
- c) To create a standard that will insure that bingo systems are fair, secure, and able to be audited and operated correctly.
- d) To distinguish between local public policy and laboratory criteria. At GLI, we believe that it is up to each local jurisdiction to set their own public policy with respect to the play of bingo.
- e) To recognize that non-bingo testing (such as electrical safety testing) should not be incorporated into this standard but left to appropriate testing laboratories that specialize in that type of testing. Except where specifically identified in the standard, testing is not directed at health or safety matters. These matters are the responsibility of the manufacturer, purchaser, and operator of the equipment.
- f) To construct a standard that can be easily changed or modified to allow for new technology.
- g) To construct a standard that does not specify any particular method or algorithm. The intent is to allow a wide range of methods to be used to conform to the standards, while at the same time, to encourage new methods to be developed.

1.2.2 No Limitation of Technology. One should be cautioned that this document should not be read in such a way that limits the use of future technology. The document should not be interpreted that if the technology is not mentioned, then it is not allowed. Quite to the contrary, as new technology is developed, we will review this standard, make changes and incorporate new minimum standards for the new technology.

1.3 Definition of an Electronic Bingo System

1.3.1 General Statement. An electronic bingo system shall be defined as the integration of various electronic components used to participate in the play of the game commonly known as bingo; as defined within the appropriate legislative framework of each State.

CHAPTER 2

2.0 *Game Server Requirements*

2.1 **Introduction**

2.1.1 General Statement. This section covers the elements common to the “back-of-the-house” operations of a Bingo System, hereinafter, ‘Game Server.’

2.2 **General Operation & Server Security**

2.2.1 General Statement. The Game Server shall generate and transmit to the Player Terminals a set of random numbers, colors and/or symbols (hereinafter, ‘balls’), depending on the rules of the Bingo game.

2.2.2 Configuration Access Requirements. The Game Server interface element setup/configuration menu(s) must not be available unless using an authorized access method that is secure.

2.2.3 Card Database Security. If cards, or seeds used to create cards, are stored on the system in a database, modification or changes to card faces shall not be permitted. Password authorization or another secure method shall control access to the database.

2.3 Ball Drawing

2.3.1 General Statement. The following are the Bingo System Game Server requirements for ball drawing:

- a) The balls shall be drawn via an approved electronic Random Number Generator certified for use in the game of Bingo;
- b) The operator shall have no discretion over which ball(s) is drawn; and
- c) The Game Server shall transmit the drawn balls to the individual Player Terminals.

2.4 Electronic Random Number Generator Requirements

2.4.1 General Statement. The use of an RNG in the selection of game symbols or production of Game Server outcomes shall:

- a) Be statistically independent;
- b) Conform to the desired random distribution;
- c) Pass various recognized statistical tests; and
- d) Be unpredictable.

2.4.2 Applied Tests. The test laboratory may employ the use of various recognized tests to determine whether or not the random values produced by the random number generator pass the desired confidence level of 95%. These tests may include, but are not limited to:

- a) Chi-square test;
- b) Equi-distribution (frequency) test;
- c) Gap test;
- d) Overlaps test;
- e) Coupon collector's test;

- f) Permutation test;
- g) Kolmogorov-Smirnov test;
- h) Adjacency criterion test;
- i) Order statistic test;
- j) Runs test (patterns of occurrences should not be recurrent);
- k) Interplay correlation test;
- l) Serial correlation test potency and degree of serial correlation (outcomes should be independent of the previous game);
- m) Tests on subsequences; and
- n) Poisson distribution.

2.4.3 Background RNG Activity Requirement. The RNG shall be cycled continuously in the background between ball draws and during game play at a speed that cannot be timed by the player. The test laboratory recognizes that some time during the game, the RNG may not be cycled when interrupts may be suspended. The test laboratory recognizes this, but shall find that this exception should be kept to a minimum.

2.4.4 RNG Seeding. The first seed shall be randomly determined by an uncontrolled event. After every ball draw, there shall be a random change in the RNG process (new seed, random timer, delay, etc.). This will verify the RNG doesn't start at the same value, every time. It is permissible not to use a random seed; however, the manufacturer must ensure that games will not synchronize.

2.4.5 Ball Drawing Games. The consequences for games depicting balls being drawn from a barrel are as follows:

- a) At the completion of each game, only balls applicable to the game are to be depicted;
- b) The barrel shall not be re-mixed except as provided by the rules of the game depicted;
- c) As balls are drawn from the barrel, they shall be used as directed by the Rules of the Game; and

- d) There cannot be any possibility of the game ball/number being drawn more than once during the same game.

2.4.6 Scaling Algorithms.

- a) If a random number with a range shorter than that provided by the RNG is required for some purpose within the Player Terminal, the method of re-scaling, (i.e., converting the number to the lower range), is to be designed in such a way that all numbers within the lower range are equally probable.
- b) If a particular random number selected is outside the range of equal distribution of re-scaling values, it is permissible to discard that random number and select the next in sequence, for the purpose of re-scaling.

2.5 Accounting/Event Reporting

2.5.1 General Statement. The on-line monitoring and/or Game Server shall be capable of maintaining the following accounting and event data and shall be capable of producing reports on demand, as required by the specific local regulatory authority:

- a) Data required to be maintained for each Bingo Game includes:
 - i. Date and time of the game start and game end;
 - ii. Cards-in-play count by location;
 - iii. Identification number of winning card(s);
 - iv. Ordered list of balls or numbers drawn;
 - v. Prize amounts awarded for each game, for each location/Player Terminal;
 - vi. All information for special games that would be required to validate a Bingo (i.e., Color, special patterns, special cards, free strips, odd/even numbers, etc.); and
- b) Sales information for each Bingo game shall include:
 - i. The name of the organization or hall;
 - ii. Price of card faces, or the price of one card;

- iii. Daily sales totals, by location;
- iv. Terminal-by-terminal sales and prizes by location;
- v. Packet Sales. There shall be an easy means to determine the specific cards sold for play, for each game. The system must provide a means to view this data based on a calendar date;
- vi. Daily network summary, by terminal, by location (applies to multiple sites using a single server);

CHAPTER 3

3.0 *Player Terminal Requirements*

3.1 **Introduction**

3.1.1 General Statement. This terminal is used by the player to place wagers, play the game of bingo, and win prizes (when applicable). The Player Terminal receives the ball draw information from the Game Server and displays the information to the player. A Player Terminal at a minimum will contain some form of activation to enroll in the Bingo Session and individual Bingo game and contain a methodology for delivery of the determined outcome. The device may be separated in parts, where some may be within or outside the Player Terminal (e.g., Player Terminals that function with a system).

3.2 **Cabinet Requirements**

3.2.1 Physical Security. A Player Terminal shall be robust enough to withstand forced illegal entry which would leave behind evidence of the attempted entry.

3.2.2 Machine and Player Safety. Electrical and mechanical parts and design principals of the Player Terminal may not subject a player to any physical hazards. The test laboratory shall NOT make any finding with regard to Safety and EMC testing, as that is the responsibility of the manufacturer of the goods or those that purchase the goods. Such Safety and EMC testing may be required under separate statute, regulation, law, or Act and should be researched accordingly, by those parties who manufacture or purchase said devices. The test laboratory shall not test for, be liable for, nor make a finding relating to these matters.

3.2.3 Environmental Effects on Game Integrity. The laboratory will perform certain tests to determine whether or not outside influences affect game fairness to the player or create cheating opportunities. A Player Terminal shall be able to withstand the following tests, resuming game play without operator intervention:

- a) Electro-Magnetic Interference. Player Terminals shall not create electronic noise that affect the integrity or fairness of neighboring machines or associated equipment;
- b) Electro-Static Interference. Protection against static discharges requires that the machine's conductive cabinets be earthed in such a way that static discharge energy shall not damage or inhibit the normal operation of the electronics or other components within the Player Terminal. Player Terminals may exhibit temporary disruption when subjected to a significant Electro-static discharge greater than human body discharge, but they shall exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or data information associated with the Player Terminal. The tests will be conducted with a severity level of a maximum of 27KV air discharge;
- c) Radio Frequency Interference (RFI). Player Terminals shall not divert from normal operation by the application of RFI at a frequency range from twenty-seven (27) to one thousand (1000) MHz with a field strength of three (3) volts per meter;
- d) Magnetic Interference. Player Terminals shall not be adversely affected by magnetic interference. The manufacturer should supply any documentation if the device has had magnetic interference testing against any recognized standard; and
- e) Liquid Spills. Liquid spills applied to the outside of a Player Terminal, shall not affect the normal operation of the machine, the integrity of the material or information stored inside the cabinet, or the safety of the players operating the equipment. If liquids are spilled into a coin acceptor or bill acceptor, the only degradation permitted is for the acceptor to reject all inputs or generate an error condition.

3.2.4 Temperature and Humidity. Player Terminals can be expected to operate in a variety of extreme environments. In the event that the designed operational parameters of a Player Terminal are exceeded, the machine, if incapable of continued proper operation, shall perform an orderly shutdown without loss of game status, accounting, and security event data. The manufacturer should supply any documentation if the device has had temperature and humidity testing against any recognized standard.

3.2.5 Surges. The machine shall not be adversely affected, other than resets, by surges or dips of $\pm 20\%$ of the supply voltage.

***NOTE:** It is acceptable for the equipment to reset provided no damage to the equipment or loss or corruption of data is experienced in the field.*

3.2.6 On/Off Switch. An on/off switch that controls the electrical current shall be located in a place which is readily accessible within the interior of the machine so that power cannot be disconnected from outside of the machine using the on/off switch. The on/off positions of the switch shall be labeled.

3.2.7 Cabinet Wiring. The Player Terminal shall be designed so that power and data cables into and out of the Player Terminal can be routed so that they are not accessible to the general public. This is for game integrity reasons only, not for health and safety. Security-related wires and cables that are routed into a logic area shall not be able to be easily removed.

3.2.8 Machine Identification. A Player Terminal shall have a not easily removable, without leaving evidence of tampering, identification badge, permanently affixed to the exterior of the cabinet by the manufacturer, and this badge shall include the following information:

- a) The manufacturer;
- b) A unique Validation Number;
- c) The Player Terminal model number; and
- d) The date of manufacture.

3.2.9 Diverter. For games that accept coins or tokens, the software shall ensure that the diverter directs coins to the hopper or to the drop box when the hopper is full. The hopper full detector shall be monitored to determine whether a change in diverter status is required. If the state of the detector changes, the diverter shall operate as soon as possible, or within ten (10) games after the state change without causing a disruption of coin flow or creating a coin jam. Hopper-less Player Terminals shall always divert coins to the drop box.

3.2.10 Drop Box. If the game is equipped to accept coins or tokens, then the following rules shall be met:

- a) Each Player Terminal equipped to accept coins or tokens shall contain a separate drop bucket or drop box to collect and retain all such coins or tokens that are diverted into the drop box;
- b) A drop bucket shall be housed in a locked compartment separate from any other compartment of the Player Terminal; and
- c) There shall be a method to electronically monitor the drop box area i.e., Door Open switches, even if manufactured by a different company.

3.2.11 External Doors/Compartment Requirements.

- a) The interior of the device shall not be accessible when all doors are closed and locked;
- b) Doors shall be manufactured of materials that are suitable for allowing only legitimate access to the inside of the cabinet (i.e., doors and their associated hinges shall be capable of withstanding determined illegal efforts to gain access to the inside of the Player Terminal and shall leave evidence of tampering if an illegal entry is made);
- c) The seal between the cabinet and the door of a locked area shall be designed to resist the entry of objects;
- d) There shall be a light on the top of the device that is clearly visible that automatically illuminates when the door to the Player Terminal, or doors to any devices connected to the Player Terminals which may affect the operation of the Player Terminals, are

opened. This requirement may be substituted for an audible alarm or a common candle for machines such as the ‘bar-top’ style;

- e) All external doors shall be locked and monitored by door-access sensors, which shall detect and report all external door openings, both to the machine by the way of an error and to an on-line system.

NOTE: The drop box door open does not have to cease game play; however, it must still illuminate the tower light or alarm and notify the on-line system;

- f) It shall not be possible to insert a device into the Player Terminal that will disable a door open sensor when the machine’s door is shut without leaving evidence of tampering; and
- g) The sensor system shall register a door as being open when the door is moved from its fully closed and locked position.

3.2.12 Logic Door and Logic Area. The logic area is a locked cabinet area (with its own independent locked door), which houses electronic components that have the potential to significantly influence the operation of the Player Terminal. There may be more than one (1) such logic area in a Player Terminal.

3.2.13 Electronic Components. Electronic component items that are required to be housed in one (1) or more logic areas are:

- a) CPUs and other electronic components involved in the operation and evaluation of game play (e.g., game controller electronics and components housing the game or system firmware program storage device);
- b) The Control Program, electronics involved in the calculation of game display and components housing display program storage medium (passive display equipment exempted); and
- c) Communication controller electronics and components housing the communication program storage media or the communication board for the on-line system may reside outside the Player Terminal.

3.2.14 Printed Circuit Board (PCB) Identification Requirements. Requirements for PCB identification:

- a) Each printed circuit board (PCB) shall be identifiable by some sort of name (or number) and revision level;
- b) The top assembly revision level of the PCB shall be identifiable (if track cuts and/or patch wires are added to the PCB, then a new revision number or level shall be assigned to the assembly); and
- c) Manufacturers shall ensure that circuit board assemblies, used in their Player Terminals, conform functionally to the documentation and the certified versions of those PCBs that were evaluated and certified by the test laboratory.

3.2.15 Patch Wires & Track Cuts. All patch wires and track cuts shall be documented, in an appropriate manner, in the relevant service manual and/or service bulletin and shall be submitted to the test laboratory. This does not prohibit required repairs in the field.

3.2.16 Power and Communication Lines. The termination points of power and communication lines shall not be accessible to players or unauthorized personnel.

3.3 Coin or Token Acceptors

3.3.1 General Statement. If the Player Terminal uses a coin acceptor, the acceptor shall accept or reject a coin on the basis of metal composition, mass, composite makeup, or equivalent security. In addition, it shall meet the following rules:

- a) Coin Acceptor Security Features/Error Conditions. The coin acceptor shall be designed to prevent the use of cheating methods such as slugging (counterfeit coins), stringing (coin pullback), the insertion of foreign objects and other manipulation;
- b) Rapidly Fed Coins. The Player Terminal shall be capable of handling rapidly fed coins or piggy backed coins so that occurrences of cheating are eliminated;

- c) Direction Detectors. The Player Terminal shall have suitable detectors for determining the direction and the speed of coin travel in the receiver. If a coin traveling at too slow of a speed or improper direction it is detected. The Player Terminal shall enter an error condition and display an error condition, until cleared by an attendant;
- d) Invalid Coins. Coins deemed invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits;
- e) Coin Acceptance Conditions. Acceptance of coins for crediting to the credit meter shall only be possible when the Player Terminal is enabled for play. Other states, such as error conditions, including door opens, audit mode and game play, shall cause the disabling of the coin acceptor system; and
- f) Credit Meter Update on Coin Insertion. Each coin inserted shall register the actual monetary value or a number of credits on the player's credit meter for the next game or bet meter. If registered directly as credits, the conversion rate shall be clearly stated or be easily ascertainable from the Player Terminal.

NOTE: The error conditions within this section shall also comply with the rules outlined within 'Error Conditions,' Section 3.13, unless otherwise noted.

3.3.2 Coin Compartments. The coin compartment shall be locked separately from the main cabinet area, except that a separate cash compartment shall not be required for coins necessary to pay prizes in a Player Terminal that pays prizes through a drop hopper.

3.4 Bill Acceptors

3.4.1 General Statement. All acceptance devices shall be able to detect the entry of valid bills, coupons, paper tokens, or other approved notes, if applicable, and provide a method to enable the Player Terminal software to discriminate, interpret and act appropriately upon a valid or invalid input. The acceptance device(s) shall be electronically based and be configured to ensure that when accepting currency, they only accept valid bills of legal tender. Bill acceptors may also accept coupons, paper tokens, or other approved notes and reject all others in a highly

accurate manner. The bill-input system shall be constructed in a manner that protects against vandalism, abuse, or fraudulent activity. In addition, bill acceptance device(s) shall meet the following rules for all acceptable types of medium:

- a) Credits. Credits shall only be registered when:
 - i. The bill or other note has passed the point where it is accepted and stacked; and
 - ii. The acceptor has sent the “irrevocably stacked” message to the machine.

3.4.2 Bill Acceptor Communications. All bill acceptors shall communicate to the Player Terminal using a bi-directional protocol.

3.4.3 Factory Set Bill Acceptors. If bill acceptors are designed to be factory set only, it shall not be possible to access or conduct maintenance or adjustments to those bill acceptors in the field, other than:

- a) The selection of bills, coupons, paper tokens, or other approved notes and their limits;
- b) Changing of certified EPROMs or downloading of certified software;
- c) Adjustment of the tolerance level for accepting bills or notes of varying quality should not be allowed externally to the machine. Adjustments of the tolerance level should only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved on a case-by-case basis;
- d) Maintenance, adjustment, and repair per approved factory procedures; or
- e) Options that set the direction or orientation of acceptance.

3.4.4 Tokenization. For games that allow tokenization, the game shall receive from the bill acceptor and post to the player the entire amount inserted.

3.4.5 Metering of Bill Acceptor Events. A Player Terminal, which contains a bill acceptor device, shall maintain sufficient electronic metering to be able to report the following:

- a) Total monetary value of all items accepted;
- b) Total number of all items accepted; and
- c) A break down of the bills accepted:
 - i. For bills, the game shall report the number of bills accepted for each bill denomination;
 - ii. For all other notes, the game shall have a separate meter that reports the number of notes accepted, not including bills.

3.4.6 Error Conditions. Each Player Terminal and/or bill acceptor shall have the capability of detecting and displaying (for bill acceptors, it is acceptable to disable or flash a light or lights) the following bill acceptor error conditions:

- a) Stacker Full – the bill acceptor should disable itself to no longer accept bills. It is recommended the game not display an explicit “stacker full” error condition.
- b) Bill Jams – it is acceptable for the bill acceptor to indicate there is a bill jam by disabling itself to accept no more bills or by some other method;
- c) Bill Acceptor Door Open – where a bill acceptor door is the belly glass door, a door open signal is sufficient; and
- d) Stacker Door Open or Stacker Removed.

NOTE: the Bill Acceptor Error Conditions listed above shall also apply to the general ‘Error Conditions,’ of this standard.

3.4.7 Power Failure during Bill Acceptance/Validation. If a power failure occurs during acceptance, the bill acceptor shall give proper credits for the bill or return the bill to the player, notwithstanding that there may be a small window of time where power may fail and credit may not be given. In this case, the window shall be less than one (1) second.

3.4.8 Self Test. The bill acceptor device shall perform a self-test at each power up. In the event of a self-test failure, the bill acceptor shall automatically disable itself (i.e., enter bill reject state) until the error state has been cleared.

3.4.9 Influence Requirements. Environmental effects, as outlined within Section 3.2.3 shall not adversely affect a bill acceptor. In addition, the manufacturer should supply any documentation if the bill acceptor has had any of these tests performed by a recognized standard.

3.4.10 Stacker Requirements. Each bill acceptor shall have a secure stacker and all accepted bills shall be deposited into the secure stacker. The secure stacker is to be attached to the Player Terminal in such a manner so that it cannot be easily removed by physical force and shall meet the following rules:

- a) The bill acceptor device shall have a ‘stacker full’ sensor;
- b) The stacker shall be independently locked, requiring a separate key to remove the stacker from the main cabinet area that is fitted with sensors that indicate door open/close or stacker removed. In addition, a separate key shall be required to remove the contents from the stacker.

3.5 Credit Redemption

3.5.1 General Statement. Available credits may be collected from the Player Terminal by the player pressing a clearly identified button or screen area designed to distribute funds from the credit meter at any time other than during:

- a) A game being played;
- b) Audit mode;
- c) Any door open;
- d) Test mode;
- e) A Credit Meter or Win Meter incrementation, unless the entire amount is placed on the meters when the collect button is pressed; or
- f) An error condition.

3.5.2 Cancelled Credit. If credits are collected, and the total credit value is greater than or equal to a specific limit (e.g., Hopper Limit for hopper games or Printer Limit for printer games),

the game shall lock up until the credits have been paid, and the handpay is cleared by an attendant.

3.6 Hoppers as the Payment Method

3.6.1 Error Conditions. There shall be under no circumstances, an abnormal payout from the hopper (if one exists) when the hopper is exposed to higher levels of electro-static discharge or if power is lost at any time during a payout. The hopper shall be interfaced in such a way as to allow the Player Terminal Control Program to monitor the hopper mechanism, in all game states, to identify at least the following events and shall meet the rules in ‘Error Conditions,’ Section 3.13:

- a) Extra coin paid; and
- b) Hopper jam or empty.

NOTE: The hopper shall be resistant to manipulation by the insertion of a light source or any foreign object.

3.7 Printers as the Payment Method

3.7.1 General Statement. Payment by voucher printer as a method of credit redemption is only permissible when:

- a) The Player Terminal is linked to a computerized system, which allows validation of the printed voucher. Validation approval or information shall come from the central system in order to validate vouchers. Vouchers may be validated at any location, as long as it meets the standards in this section. Provisions must be made if communication is lost and validation information cannot be sent to the central system, thereby requiring the manufacturer to have an alternate method of payment. The

validation system must be able to identify duplicate vouchers to prevent fraud by reprinting and redeeming a voucher that was previously issued by the Player Terminal; or

- b) By use of an approved alternative method that includes the ability to identify duplicate vouchers to prevent fraud by reprinting and redeeming a voucher that was previously issued by the Player Terminal.

3.7.2 Payment by Voucher Printer. The printer shall print on a voucher and provide the data to an on-line data system that records the following information regarding each payout voucher printed. The information listed below can be obtained from the Player Terminal, interface board, the on-line data management system, or another means:

- a) Value of credits in local monetary units in numerical form;
- b) Time of day the voucher was printed in twenty-four (24) hour format showing hours and minutes – printing of this information is not required, provided that storage of this information is in the database;
- c) Date, in any recognized format, indicating the day, month, and year;
- d) Player Terminal number or machine number; and
- e) Unique Validation Number, or barcode.

3.7.3 Taxation Limit. If an applicable taxation limit is reached on any single play when using a voucher printer, then the voucher must not be able to be redeemed at any place other than through human interaction.

3.7.4 Printer Location. If a Player Terminal is equipped with a printer, it shall be located in a locked area of the Player Terminal (e.g., require opening of the main door to access), but not in the logic area or the drop box. This requirement ensures that changing the paper does not require access to the drop (cash) or logic areas.

3.7.5 Error Conditions. A printer shall have mechanisms to allow software to interpret and act upon the following conditions:

- a) Out of paper/paper low;
- b) Printer jam/failure; and
- c) Printer disconnected, it is permissible to detect a disconnection when the software tries to print or at any other time.

NOTE: These conditions shall trigger an error condition to indicate the error has occurred see also ‘Error Conditions,’ Section 3.13, of this standard.

3.8 Contents of Critical Memory

3.8.1 General Statement. Critical memory is used to store all data that is considered vital to the continued operation of the gaming device and/or system. This includes, but is not limited to:

- a) All electronic meters required in ‘Electronic Accounting and Occurrence Meters’ Section 3.12.6 including last bill data and power up and door open metering;
- b) Current credits;
- c) Gaming device/game configuration data;
- d) Information pertaining to the last ten (10) plays with the game outcome (including the current game, if incomplete); and
- e) Software state (the last normal state, last status or tilt status the gaming device software was in before interruption).

NOTE: It is strongly recommended that any payable information residing in memory be designated critical memory.

NOTE: All of the above should be checked for corruption. If values are corrupt, game play should cease and at a minimum display an appropriate correlating error message.

3.9 Maintenance of Critical Memory

3.9.1 General Statement. Critical memory storage shall be maintained by a methodology that enables errors to be identified. This methodology may involve signatures, checksums, partial checksums, multiple copies, timestamps and/or effective use of validity codes.

3.9.2 Comprehensive Checks. Comprehensive checks of critical memory shall be made following game initiation but prior to display of the game outcome to the player. In addition it is strongly recommended that critical memory be either continuously monitored for corruption or that comprehensive checks occur at the following significant events:

- a) Device power-up;
- b) Main door opening; and
- c) Attendant Paid Jackpots.

In addition, it is recommended that a triple redundancy check be implemented. Test methodologies shall detect 99.99 percent of all possible failures including but not limited to items defined in section 3.8.1 and at a minimum enable errors to be identified.

3.9.3 General Statement. An unrecoverable corruption of RAM shall result in a RAM error. The RAM should not be cleared automatically and should result in a tilt condition, which identifies the error and causes the gaming device to cease further function. An unrecoverable RAM error shall require a full RAM clear performed by an authorized person.

3.9.6 RAM and PSD Space. Non-volatile memory space that is not critical to machine security (e.g., video or sound) is not required to be validated.

3.10 Program Storage Device Requirements

3.10.1 General Statement. All Program Storage Devices, including EPROMs, ROMs, Flash-ROMs, DVD, CD-ROM, Compact Flash, Hard Drives, Partitions and any other type of Program Storage Devices shall:

- a) Be housed within a locked logic compartment.
- b) Be disabled via hardware or software means from being written to during normal operation of the gaming device.
 - i. The use of Read/Write partitions for non integral game functions on the control program media are permissible assuming the design ensures that the Read/Write abilities are constrained to the designated sectors of the media.

NOTE: All forms of write-protection will be reviewed on a case by case basis by the test laboratory in conjunction with the regulatory agency.

3.10.2 For Program Storage Devices that are written to once (i.e., EPROM, CD), the following rules shall be met:

- a) CD-ROM specific based Program Storage shall:
 - i. Not be a re-writeable disk; and
 - ii. The “Session” shall be closed to prevent any further writing.
- b) EPROM specific based Program Storage:
 - i. Shall be verified for possible corruption due to failure of the program storage media. The authentication may use a checksum; however, it is recommended that a Cyclic Redundancy Check (CRC) be used at a minimum (at least 16-bit)
- c) Non-EPROM specific Program Storage shall meet the following rules:
 - i. The Control Program shall authenticate all Critical Files by employing a hashing algorithm which produces a message digest of at least 128 bits at minimum, as certified by the test laboratory and agreed upon by the jurisdiction. A Message

Digest(s) shall be stored on a memory device (ROM-based or other media) within the Gaming device and shall be verifiable via an independent integrity check as described in section 3.10.4. Message Digests contained on any media other than ROM-based media shall be encrypted, using a public/private key algorithm with a minimum of a 512 bit key with the public key residing on a separate ROM-based media device. However, a 768 bit key is recommended, or an equivalent encryption algorithm with similar security certified by the test laboratory and agreed upon by the jurisdiction.

- ii. The Gaming device shall authenticate all Critical Files against the stored Message Digest(s), as required in (i), above. In the event of a failed authentication, after the game has been powered up, the Gaming device should immediately enter an error condition with the appropriate tower light signal and display an appropriate error. This error shall require operator intervention to clear. The game shall display specific error information and shall not clear until either the file authenticates properly, following the operator intervention.

NOTE: the values in (c)(i) and (c)(ii), above will constantly be re-evaluated based on technology advancements and new security methods available.

3.10.3 Any programs or fixed data residing in allocated and addressable space on the control program media shall be authenticated as specified in section 3.10.2 (c)

3.10.4 Control Program. It is recommended that the control program (software that operates the gaming device's functions) allow for the gaming device to continually ensure the integrity of all control program components residing in non-volatile memory and executing out of volatile memory.

3.10.5 Control Program Verification The device shall have the ability to allow for an independent integrity check of the device's software from an outside source and is required for all control components that may affect the integrity of the game. This must be accomplished by

being authenticated by a third-party device, which may be embedded within the game software (see NOTE below) or having an interface port for a third-party program to execute and authenticate the media. This integrity check will provide a means for field verification of the software to identify and validate the program. The test laboratory, prior to device approval, shall approve the integrity check method.

NOTE: If the authentication program is contained within the game software, the manufacturer must receive written approval from the test laboratory prior to submission.

3.11 Rules of Play

3.11.1 General Statement. Payglasses or video displays (help screens) shall be clearly identified and shall accurately state the rules of the game and the award that will be paid to the player when the player obtains a specific win and include the following:

- a) **Designation of Awards.** The payglasses or video displays shall clearly indicate whether awards are designated in denominational units, currency, or some other unit.
- b) **Display of Game Play.** Unless otherwise denoted on the payglass, where the Player Terminal displays the game outcome in a form other than the standard Bingo card format all winning symbol patterns and their correlation to winning card patterns must be clearly displayed.
- c) **Change in Award Value.** The Player Terminal shall reflect any change in award value, which may occur in the course of play. This may be accomplished with a digital display in a conspicuous location to the Player Terminal, and the game must clearly indicate such.
- d) **Access to Payable Information.** All payable information should be able to be accessed by a player, prior to them committing to a bet. Payglasses or video displays shall not be certified if the information is inaccurate or may cause confusion. The “reasonable player” standard shall be used for evaluation;

- e) Upcoming wins. The game shall not advertise ‘upcoming wins,’ (i.e., three (3) times pay coming soon.)
- f) Information to be Displayed. A Player Terminal shall display the following information to the player before the game commences:
 - i. The player’s current credit balance;
 - ii. The current bet amount. This is only during the base game or if the player can add to the bet during the game;
 - iii. All possible winning outcomes or be available as a menu item or on the help menu;
 - iv. Win amounts for each possible winning outcome or be available as a menu or help screen item;
 - v. The amount won for the last completed game (until the next game starts or betting options are modified) unless the game can not be completed (e.g. it is cancelled by the patron); and
 - vi. The player options selected (e.g., bet amount, lines played) for the last completed game (until the next game starts or a new selection is made) unless the game can not be completed (e.g. it is cancelled by the patron).

3.12 Metering

3.12.1 Credit Meter Units and Display. The credit meter shall be maintained in credits or cash value (i.e. applicable local currency).

3.12.2 Credit Meter – Incrementing. The credit meter shall be used to reflect the player’s current balance as appropriate.

3.12.3 Progressives. Progressives may be added to the credit meter if either:

- a) The credit meter is maintained in the local currency amount; or
- b) The progressive meter is incremented to whole credit amounts; or

- c) The prize in the local currency amount is converted to credits on transfer to the player's credit meter in a manner that does not mislead the player (i.e., make unqualified statement "wins meter amount" and then rounds down on conversion) or cause accounting imbalances; and
- d) If the prize does not exceed the local taxation limit.

3.12.4 Collect Meter. There shall be the facility for a collect meter which will show the number of credits or cash collected by the player (the number of credits or cash collected shall be subtracted from the player's credit meter and added to the collect meter).

3.12.5 Software Meter Information Access. The software meter information shall be accessible by an authorized person.

3.12.6 Electronic Accounting and Occurrence Meters. Each Player Terminal shall have electronic accounting meters that are at least eight (8) digits in length. If the meter is being used in dollars and cents, at least eight (8) digits must be used for the dollar amount. The meter must roll over to zero upon the next occurrence, any time the meter is eight (8) digits or higher and after 99,999,999 has been reached or any other value that is logical. Occurrence meters shall be at least three (3) digits in length and roll over to zero upon the next occurrence, any time the meter is higher than the maximum number of digits for that meter. The required electronic meters are as follows (accounting meters are designated with an asterisk '*'):

- a) The amounts-in* (OR cash-in, coin-in or money played) meter shall cumulatively count the total amounts wagered during game play.
- b) The amounts-out* (OR credit-out, total coin out or money won) meter shall cumulatively count all amounts paid by the Player Terminal as a result of winning wagers, whether the payout is made from the hopper, ticket printer, to a credit meter or by any other means. This meter must not increment for bills inserted and cashed out (used as a change machine).

c) The drop* meter shall maintain a cumulative count of the number of coins that have been diverted into a drop bucket and credit value of all bills and vouchers/coupons inserted into the bill acceptor for play.

NOTE: It is acceptable to have separate 'drop' meters for coins, bills, vouchers and coupons.

d) The jackpots* meter shall reflect the cumulative amounts paid for progressive and non-progressive handpays.

e) The games-played meter shall display the cumulative number of games played since the last RAM clear.

f) A cabinet door meter shall display the number of times the front cabinet door was opened since the last RAM clear.

g) The drop door meter shall display the number of times the drop door or the bill acceptor door was opened since the last RAM clear.

h) The cancelled credit* meter shall reflect the total value paid by an attendant resulting from a player initiated cash-out that exceeds the physical or configured capability of the machine to make the proper payout amount.

NOTE: printer games do not require a cancelled credit meter unless, a 'printer limit' option exists on the game.

i) The progressive occurrence meter shall count the number of times each progressive meter is awarded.

j) Ticket/Voucher Voucher In*. If a voucher system is utilized to accept payment, the machine must have a meter that accumulates the total value of all slot machine wagering vouchers accepted by the machine; (A.K.A. Ticket-in)

k) Ticket/Voucher Voucher Out*. If a voucher system is utilized to accept payment, the machine must have a meter that accumulates the total value of all slot machine wagering vouchers and payout receipts issued by the machine; (A.K.A. Ticket-Out)

3.13 Error Conditions

3.13.1 General Statement. Each Player Terminal shall be capable of detecting and displaying the following error conditions and illuminate the tower light for each or sound an audible alarm. In addition, the game play on that terminal shall cease. These error conditions shall be cleared by an attendant, unless otherwise noted, and be communicated to an on-line monitoring and control system, if applicable:

- a) Coin-in jam;
- b) Coin-out jam;
- c) Hopper empty or timed out;
- d) Hopper runaway or extra Coin paid out, see also ‘Hoppers as a Payment Method,’ Section 3.6;
- e) RAM error;
- f) Low RAM battery, for batteries external to the RAM itself or low power source;
- g) Currency-in jam;
- h) Program error or authentication mismatch;
- i) Door open (including bill acceptor);
- j) Reverse coin-in (coin traveling wrong way through acceptor);
- k) Microprocessor controlled mechanical device errors (i.e., Reels or Wheels or other top box/bonus feature or game display unit). This includes a mis-index condition that would affect the outcome of the game, and:
 - i. The specific reel number shall be identified in the error code, if applicable;
 - ii. In the final positioning of the mechanical device, if the position error exceeds one-half of the width of the smallest symbol excluding blanks on the reel strip; and
 - iii. Be monitored to detect malfunctions such as a reel that is jammed, or is not spinning freely, loss of communications with the game, or any attempt to manipulate their final resting position.

- 1) Power reset – This error condition does not require an attendant to clear.

NOTE: This rule also applies to the 'Bill Acceptor Error Conditions' and the 'Printer Error Conditions' of this standard.

3.13.2 Error Condition Explanation. For games that use error codes, an explanation of their meanings shall be affixed inside the Player Terminal. This does not apply to video-based games; however, video based games shall display meaningful text describing the error condition(s).

3.14 Program Interruption & Resumption

3.14.1 Interruption. After a program interruption (e.g., power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring, provided there is no advantage or disadvantage to the player(s).

3.14.2 Restoring Power. If a Player Terminal is powered down while in an error condition, then upon restoring power, the error message shall be displayed and the Player Terminal shall remain locked-up. That is unless power-down is used as part of the error reset procedure, or if on power-up or door closure, the Player Terminal checks for the error condition and detects that the error is no longer in existence.

3.14.3 Simultaneous Inputs. The program shall not be adversely affected by the simultaneous or sequential activation of the various inputs and outputs, such as 'play buttons', which might, whether intentionally or not, cause malfunctions or invalid results.

3.14.4 Resumption. On program resumption, the following procedures shall be performed as a minimum requirement:

- a) Any communications to an external device shall not begin until the program resumption routine, including self-tests, is completed successfully;

- b) Player Terminal control programs shall test themselves for possible corruption due to failure of the program storage media as specified in section 3.10.
- c) The integrity of all critical memory shall be checked;
- d) Shall meet the rules outlined in Interruption, above.

3.15 Door Open/Close

3.15.1 Door Metering. The software shall be able to detect and meter access to the following doors or secure areas:

- a) All external doors;
- b) Drop box door;
- c) Bill acceptor door; and
- d) Logic board compartment, if applicable.

3.15.2 Door Open Procedures. When the Player Terminal's main door is opened, the game shall cease play, enter an error condition, display an appropriate error message, disable coin acceptance and bill acceptance, and either sound an alarm or illuminate the tower light or both.

3.15.3 Door Close Procedures. When the Player Terminal's main door is closed, the game shall return to its original state* and display an appropriate error message, until the next game has ended.

**NOTE: The game shall return to its original state provided there is no advantage or disadvantage to the player(s).*

3.16 Taxation Reporting Limits

3.16.1 General Statement. The game shall be capable of entering a lock up condition if a single event is in excess of a limit that is required by a taxing jurisdiction.

3.17 Test/Diagnostic Mode

3.17.1 General Statement. If in a test mode, any test that incorporates credits entering or leaving the Player Terminal (e.g., a hopper test) shall be completed on resumption of normal operation. In addition, there shall not be any test mode that increments any of the electronic meters. Any credits on the Player Terminal that were accrued during the test mode shall be cleared before the test mode is exited. Test meters are permissible provided the meter indicates as such.

3.17.2 Entry to Test/Diagnostics Mode. The main cabinet door of the Player Terminal may automatically place the Player Terminal in a service or test-mode. Test/diagnostics-mode may also be entered via an appropriate instruction from an attendant during an audit mode access.

3.17.3 Exiting From Test/Diagnostic Mode. When exiting from test mode, the game shall return to the original state* it was in when the test mode was entered.

**NOTE: The game shall return to its original state provided there is no advantage or disadvantage to the player(s).*

3.17.4 Test Games. If the Player Terminal is in a game test mode, the Terminal shall clearly indicate that it is in a test mode, not normal play. In addition, the system shall not see the device as a participating Player Terminal.

3.18 Last Game Recall

3.18.1 Number Of Last Plays Required. Information on at least the last ten (10) games is to be always retrievable on the operation of a suitable external key-switch or another secure method that is not available to the player.

3.18.2 Last Play Information Required. Last play information shall provide all information required to fully reconstruct the last ten (10) games. All values shall be displayed, including the initial credits, credits bet, credits won, and credits paid. If a progressive was awarded, it is

sufficient to indicate the progressive was awarded and not display the value. This information should include the final game outcome.

3.19 Wireless Ethernet Communication

3.19.1 General Statement. Should a wireless Ethernet communication solution be adopted, then additional security precautions must be taken. The current wireless Ethernet technology (Wi-Fi) is vulnerable and should not be considered inherently secure. The wired LAN (Local Area Network) must be isolated from the wireless (WLAN) network through the layering of additional network security methods. The following recommendations are to be considered minimum recommendations and not restrictions:

- a) The wireless access point must be physically positioned in the building so that it is not easily accessible by unauthorized individuals.
- b) The access point must not be placed directly onto the casino network unless a stand-alone state-full packet inspection firewall is employed.
- c) Wireless network traffic must be secured with additional encryption to compensate for the weaknesses in Wi-Fi.
- d) The keys used to encrypt the communication through the wireless network must be stored in a secure location.

Appendix A: Revision History

Electronic Bingo Systems

GLI-22 Revision 2.0

Revision 2.0 January 22, 2010, *Final*

Revision 1.1 June 22, 2004

Date Released: December 15, 2003

REVISION HISTORY

REV 2.0

- Removed all references to Tribal gaming and Class II.
- Removed all hyperlinks.
- Removed all sections listed as “RESERVED” and renumbered the following sections accordingly.
- Various Grammatical and clarification changes were made throughout the document.
- Moved Revision History to Appendix A.
- Removed Rev 1.1 section 1.1.2 Class II Electronic Bingo Systems Defined.
- Removed Rev 1.1 section 1.1.3 Phases of Certification.
- Removed Rev 1.1 section 1.2 Acknowledgement of Other Standards Reviewed.
- Moved Rev 1.1 section 1.3 Purpose of Standards to Rev 2.0 section 1.2, renamed Purpose of Technical Standards, and renumbered subsections accordingly.
- Added Rev 2.0 section 1.2.1 d) regarding distinguishing between local public policy and laboratory criteria.
- Removed Rev 1.1 section 1.3.3 Scope of Standard.
- Added Rev 2.0 section 1.3 Definition of an Electronic Bingo System.
- Removed Rev 1.1 section 1.4 Other Documents That May Apply
- Removed Rev 1.1 section 1.5 Definitions. Moved the definition of ‘Critical Memory’ to Rev 2.0 section 3.8 Contents of Critical Memory.

- Added Rev 2.0 3.8.1 c) “Any payable information residing in memory” and renumbered subsections accordingly.
- Changed “the last five (5) plays” to “the last ten (10) plays in Rev 2.0 3.8.1 e)
- Added a note regarding checking for corruption and handling errors to Rev 2.0 section 3.8.1.
- Removed Rev 1.1 Chapter 2.
- Removed Rev 1.1 Chapter 3.
- Moved Rev 1.1 Chapter 4.0 Game Server Requirements to Rev 2.0 Chapter 2.0 and renumbered subsections accordingly.
- Removed references to different types of systems in Rev 2.0 section 2.1.1.
- Removed reference to where results are determined and transmitted in Rev 2.0 section 2.2.1.
- Removed Rev 1.1 section 4.2.2 Security and renumbered subsections accordingly.
- Clarified Rev 2.0 section 2.2.3 Card Database Security to remove requirement that all permutations of cards must be stored in a database.
- Moved Rev 1.1 section 4.3 Wireless Ethernet Communication to Rev 2.0 section 3.19 and renumbered subsections accordingly.
- Added n) Poisson distribution as a test for the random number generator in Rev 2.0 section 2.4.2.
- Changed Rev 2.0 section 2.4.5 subsection a) to state the balls applicable to the game must be depicted at the “completion of each game” instead of at the “start of each game.”
- Removed the word “immediately” from Rev 2.0 section 2.4.5 subsection c).
- Removed Rev 1.1 section 4.6 Mechanical Random Number Generator Requirements and renumbered subsections accordingly.
- Added “or the price of one card” to Rev 2.0 section 2.5.1 b) ii.
- Clarified “game-by game” in Rev 2.0 section 2.5.1 b) iv. to state “terminal-by- terminal”.
- Clarified “daily reports based on the calendar date must provide this information” in Rev 2.0 section 2.5.1 b) v. to state “the system must provide a means to view this data based on a calendar date.”
- Clarified “by game” in Rev 2.0 section 2.5.1 b) vi. to state “by terminal”.

- Removed Rev 1.1 section 4.7.1 b) vii. and viii.
- Moved Rev 1.1 Chapter 5.0 Player Terminal Requirements to Rev 2.0 Chapter 3.0 and renumbered subsections accordingly.
- Removed “unless such entry causes an error code or is cleared at the commencement of a new play, and which does not affect the subsequent play or any other play, prize or aspect of the game” from Rev 2.0 section 3.2.1.
- Changed “minimum of 27KV” to “maximum of 27KV” in Rev 2.0 section 3.2.3 b).
- Removed “see also ‘Error Conditions,’ Section 5.12, of this standard” from Rev 1.1 section 5.2.3 e).
- Removed Rev 1.1 section 5.2.11 e) Bar-top Game Exception and renumbered subsections accordingly.
- Removed Rev 1.1 section 5.2.14 Non-Volatile RAM Requirements and renumbered subsections accordingly.
- Removed Rev 1.1 section 5.4.6 Bill Recall and renumbered subsections accordingly.
- Removed Rev 1.1 section 5.4.11 Stacker Requirements subsection c).
- Clarified “COLLECT button” in Rev 2.0 section 3.5.1 to state “a clearly identified button or screen area designed to distribute funds from the credit meter.”
- Removed the note regarding retaining the last thirty-five (35) vouchers from Rev 1.1 5.7.2 Payment by Voucher Printer.
- Removed “(not on another machine or at a self-serve Kiosk)” from Rev 2.0 section 3.7.3 Taxation Limit.
- Moved Rev 1.1 section 5.9 to Rev 2.0 section 3.9, renamed it from “Critical RAM Requirements” to “Maintenance of Critical Memory”, and renumbered subsections accordingly.
- Added Rev 2.0 section 3.9.1 General Statement regarding identifying errors in critical memory storage and renumbered subsections accordingly.
- Added clarification to Rev 2.0 section 3.9.2 Comprehensive Checks regarding recommendations of when to check for critical memory corruption and that triple redundancy checks be implemented. Added reference to 3.8.1 as items that should be checked for errors.

- Renamed Rev 1.1 section 5.9.2 Unrecoverable Critical Memory to 3.9.3 General Statement.
- Added clarification to Rev 2.0 section 3.9.3 General Statement regarding RAM errors should cause the device to cease function. Changed “an uncorrectable corruption” to “an unrecoverable corruption.”
- Added Rev 2.0 section 3.9.4 Control Program which recommends the control program allow for continuous monitoring of control program components in the non-volatile memory.
- Moved Rev 1.1 section 5.8.1 b) to Rev 2.0 section 3.9.5 Program Storage Devices (PSDs). Clarified that the validation and corruption of control program components should be checked.
- Clarified Rev 2.0 section 3.9.5 a) to include validation after any reset.
- Moved note in Rev 1.1 section 5.8.1 b) to Rev 2.0 section 3.9.6.
- Moved Rev 1.1 section 5.8 Program Storage Device Requirements to Rev 2.0 section 3.10 and renumbered subsections accordingly.
- Removed Rev 1.1 section 5.8.1 a), c), and e) and renumbered subsections accordingly.
- Removed reference to write once program storage in Rev 2.0 section 3.10.2.
- Moved Rev 1.1 section 5.13.4 b) to Rev 2.0 section 3.10.2 b) and renumbered subsections accordingly.
- Removed note regarding international jurisdiction in Rev 1.1 section 5.8.2 b) i.
- Clarified Rev 2.0 section 3.10.2 c) ii. to refer to bingo devices instead of player terminals and added a recommendation for internal controls on the error logs.
- Renamed Rev 1.1 section 5.8.3 Writable Program Storage to Rev 2.0 section 3.10.3 Alterable Program Storage.
- Clarified Rev 2.0 section 3.10.3 to refer to bingo devices instead of player terminals and outlined what does not alterable program storage does not include.
- Removed Rev 1.1 section 5.8.3 a)
- Removed the wording “it is recommended” in Rev 2.0 section 3.10.3 a)
- Removed Rev 1.1 section 5.8.3 a) iv.
- Removed note regarding SCSI devices from Rev 1.1 section 5.8.3.

- Added note to Rev 2.0 section 3.10.3 stating that all forms of write protection will be reviewed on a case-by-case basis.
- Added Rev 2.0 section 3.10.4 Control Program Verification regarding independent integrity checks of the device's software.
- Added a note to Rev 2.0 section 3.10.4 regarding written approval needed if the authentication program is within the game software.
- Changed “at all times the machine is available for player input” to “before the game commences” in Rev 2.0 section 3.11.1 f).
- Added the clarification “unless the game can not be completed (e.g. it is cancelled by the patron)” to Rev 2.0 section 3.11.1 f) v. and vi.
- Rev 2.0 section 3.12.2 was reworded to “the credit meter shall be used to reflect the player's current balance as appropriate.”
- Clarified “amounts-in” in Rev 2.0 section 3.12.6 to include “coin-in or money played).
- Clarified “amounts-out” in Rev 2.0 section 3.12.6 b) to include “total coin-out or money won” and removed “directly”.
- Removed “by an attendant” from Rev 2.0 section 3.12.6 b).
- Clarified Rev 2.0 section 3.12.6 h) regarding the cancelled credit meter.
- Added Rev 2.0 sections 3.12.6 j) and k) which are regarding Ticket/Voucher Voucher In and Ticket/Voucher Voucher Out respectively.
- Removed wording regarding the types of signatures for control programs and added a reference to section 3.10 in Rev 2.0 section 3.14.4 b).
- Clarified Rev 2.0 section 3.16.1 to allow for other types of payment besides just attendant hand pays.
- Updated Rev 2.0 section 3.18.1 and 3.18.2 to require information to fully reconstruct the last ten (10) games instead of the last five (5) games.

REV 1.1

- Various Grammatical and clarification changes were made throughout the document.
- Please note that there were many comments with recommended changes to the sections that provide NIGC Opinions and Guidance Bulletins. This information was incorporated for

informational purposes only and to provide readers with a general understanding of the type of equipment that this standard covers.

- Section 1.3.3 changed the Scope of the Standard to include ‘randomness of selection of balls or numbers’ and ‘reasonable security of player terminals’
- Section 1.4 - Previously the document included Chapter 5 which addressed specific On-Line Accounting System requirements. Since the Game Server requirements are specific to this standard and may be incorporated within the On-Line Accounting System Requirements and/or Ticket Validation System, only the Game Server System requirements are incorporated and Section 1.4 Other Documents that May Apply has been changed to refer to the other GLI standards, where applicable.
- Section 1.5 Definitions has been enhanced.
- Section 4.5.5(d) was added to clarify that there can not be any possibility of the same Ball/Number being drawn twice during the same game.
- Section 5.3.1 was changed to refer to the ‘regulatory authority’ instead of the ‘local ordinance’.
- Section 5.8 & 5.9 previously addressed the WORM Write Once Read Many requirements. This entire section was re-formatted to make it more easily understood.
- Section 5.11.6(b) changed the ‘Amounts Out’ rule to better clarify that this meter only applies to the amounts paid by the game and does not include handpays.
- Chapter 6 is now Chapter 5.